# DC VOLTAGE OUTPUT (2 Years, 23°C ± 5°C)

OUTPUT VOLTAGE: 0 to +15V DC. OUTPUT ACCURACY: ±(0.05% + 10mV). PROGRAMMING RESOLUTION: 5mV. READBACK ACCURACY<sup>1</sup>: ±(0.05% + 3mV).

**READBACK RESOLUTION:** 1mV.

**OUTPUT VOLTAGE SETTLING TIME:** 5ms to within stated accuracy.

**LOAD REGULATION:** 0.01% + 2mV. **LINE REGULATION:** 0.5mV.

**STABILITY<sup>2</sup>:** 0.01% + 0.5mV.

TRANSIENT RESPONSE TO 1000% LOAD CHANGE:

Transient Recovery Time<sup>3,4</sup>:<40µs to within 100mV of previous level.

<80µs to within 20mV of previous level.

Transient Voltage Drop: <100mV, typical.3

<200mV, typical.4

RIPPLE AND NOISE (20Hz to 20MHz): 3mV rms/8mV p-p, typical.

**REMOTE SENSE:** 1V max. drop in each lead. Add 2mV to the voltage load regulation specification for each 1V change in the negative output lead due to load current change.

## DC CURRENT (2 Years, $23^{\circ}C \pm 5^{\circ}C$ )

OUTPUT CURRENT: 0-9V: 5A max. >9V-15V: 3A max. (not intended to be operated in parallel).

COMPLIANCE ACCURACY: ±(0.16% + 5mA)<sup>5</sup>.

PROGRAMMED COMPLIANCE RESOLUTION: 1.25mA.

READBACK ACCURACY

2303¹: 5A range:  $\pm (0.2\% + 400\mu A)$ . 5mA range:  $\pm (0.2\% + 1\mu A)$ . 2303-PJ¹:5A range:  $\pm (0.2\% + 400\mu A)$ . 500mA range:  $\pm (0.2\% + 40\mu A)$ .

READBACK RESOLUTION

**STABILITY<sup>4</sup>:**  $0.01\% + 50\mu A$ .

 2303:
 5A range:  $100\mu$ A.
 5mA range:  $0.1\mu$ A.

 2303-PJ:
 5A range:  $100\mu$ A.
 500mA range:  $10\mu$ A.

CURRENT SINK CAPACITY: 0–5V: 2A max. 5V–15V: Derate 0.1A per volt above 5V.

 $\label{load_regulation: 0.01\% + 1mA. Line regulation: 0.5mA. }$ 

### **DIGITAL VOLTMETER INPUT**

 $(2 \text{ Years}, 23^{\circ}\text{C} \pm 5^{\circ}\text{C})$ 

INPUT VOLTAGE RANGE: 0 to +20V DC. INPUT IMPEDANCE:  $10^{10}\Omega$  typical.

MAXIMUM VOLTAGE (either input terminal) WITH RESPECT TO OUTPUT LOW: -3V, +22V.

**READING ACCURACY<sup>1</sup>:**  $\pm (0.05\% + 3\text{mV})$ .

READING RESOLUTION: 1mV.

#### DC GENERAL

MEASUREMENT TIME CHOICES: 0.01 to 10 PLC7, in 0.01PLC steps.

**AVERAGE READINGS:** 1 to 10. **READING TIME** <sup>1,8,9</sup>: 31ms, typical.

### PULSE CURRENT MEASUREMENT OPERATION

TRIGGER LEVEL:

**2303:** 5mA to 5A, in 5mA steps.

2303-PJ: 5A Range: 0mA to 5A, in 5mA steps.

500mA Range: 0mA to 500mA, in 0.5mA steps.

TRIGGER DELAY: 0 to 100ms, in 10µs steps.

INTERNAL TRIGGER DELAY: 25µs.

HIGH/LOW/AVERAGE MODE:

Measurement Aperture Settings: 33.3µs to 833ms, in 33.3µs steps.

Average Readings: 1 to 100.

**BURST MODE:** 

Measurement Aperture: 33.3µs. Conversion Rate: 3600/second, typical. Number of Samples: 1 to 5000.

Transfer Samples Across IEEE Bus in Binary Mode: 4800 bytes/ second, typical.

LONG INTEGRATION MODE: Measurement Time6: 850ms (840ms) to 60 seconds in 16.7ms (20ms) steps.

### **GENERAL**

ISOLATION (low-earth): 22V DC max. PROGRAMMING: IEEE-488.2 (SCPI). USER-DEFINABLE POWER-UP STATES: 5.

REAR PANEL CONNECTOR: 8-position quick disconnect terminal block for output (4), sense (2), and DVM (2).

TEMPERATURE COEFFICIENT (outside 23°C ±5°C): Derate accuracy specification by (0.1 × specification)/°C.

**OPERATING TEMPERATURE:** 

0° to 35°C (Full power). 0° to 50°C (Derate to 70%).

STORAGE TEMPERATURE: -20° to 70°C. HUMIDITY: <80% @ 35°C non-condensing. POWER CONSUMPTION: 150VA max.

REMOTE DISPLAY/KEYPAD OPTION: Disables standard front panel.

**DIMENSIONS:** 89mm high  $\times$  213mm wide  $\times$  360mm deep (3½ in  $\times$  8½ in  $\times$  14¾6 in).

SHIPPING WEIGHT: 5.4kg (12 lbs).

INPUT POWER: 100V-240V AC, 50 or 60Hz (auto detected at power-up).

WARRANTY: Two years parts and labor on materials and workmanship.

EMC: Conforms with European Union Directive Directive 89/336/EEC EN 55011, EN 50082-1, EN 61000-3-2 and 61000-3-3, FCC part 15 class B.

SAFETY: Conforms with European Union Directive 73/23/EEC EN 61010-1.

AC LINE LEAKAGE CURRENT: 450μA @ 110VAC, typ.; 600μA @ 220VAC, typ.

RELAY CONTROL JACK: 1-channel, sink 150mA max., 15V max. 5V output, 100mA max., also available on jack. Accepts 0.173 in Bantam-type plug (CS-1003-1).

ACCESSORIES SUPPLIED: User manual, service manual, output connector mating terminal (part no. CS-846).

## ACCESSORIES AVAILABLE:

**Model 2304-DISP:** Remote Display/Keypad (4.6 in × 2.7 in × 1.5 in). Includes 2.7m (9 ft) cable and rack mount kit.

**Optional Version Model 2303B:** 2303 with blank front panel (only AC power indicator LED).

 $^{1}$  PLC = 1.00.

- $^2$  Following 15 minute warm-up, the change in output over 8 hours under ambient temperature, constant load, and line operating conditions.
- $^{\scriptscriptstyle 3}\,$  Remote sense, at output terminals, 1000% load change; typical.
- <sup>4</sup> Remote sense, with 4.5m (15 ft) of 16 gauge wire and 1Ω resistance in each source lead to simulate typical test environment, up to 1.5A load change.
- <sup>5</sup> Minimum current in constant current mode is 6mA.
- 6 60Hz (50Hz).
- <sup>7</sup> PLC = Power Line Cycle. 1PLC = 16.7ms for 60Hz operation, 20ms for 50Hz operation.
- <sup>8</sup> Display off.
- <sup>9</sup> Speed includes measurement and binary data transfer out of GPIB.

Specifications subject to change without notice.